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ABSTRACT

Self-regulated learning is usually viewed as the fusion of skill and will, referring to the students' development of different learning strategies in service of their goals. This definition is expanded in a study of self-schemas as a means of representing multiple goals for learning. Measures of self-schemas were used with 151 seventh graders (86 females and 65 males) to explore how individuals may regulate their achievement behaviors as a function of cognitive self-representations. This study also examined how two motivational strategies, self-handicapping and defensive pessimism, influenced cognitive engagement and effort in a learning task. Results indicate that self-schemas can be viewed as organizations of multiple goals (measuring incorporated intrinsic, extrinsic, and social concerns), and that students' motivational strategies are indeed related to cognitive engagement. This study points to self-schemas, motivational strategies, and cognitive strategies as important factors in truly self-regulated learning. (SLD)

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Self-schemas, motivational strategies and self-regulated learning

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Abstract

Self-regulated learning (SRL) is generally viewed as the fusion of "skill" and "will." Skill refers to students use of different cognitive, metacognitive, and volitional control strategies, and will refers to the goals (intrinsic/mastery, or extrinsic/performance) students have for learning. Accordingly, SRL as the fusion of skill and will refers to students' deployment of different learning strategies in service of their goals. Our intent here was to try to extend this definition two ways. First, we offer self-schemas as a means of representing multiple goals for learning (i.e., not just intrinsic or extrinsic) and of putting the self back into self-regulated learning. Following the lead of Markus and her colleagues, we used measures of self-schemas to explore how individuals may regulate their achievement behaviors as a function of these cognitive self-representations. Second, we propose that students not only have cognitive, metacognitive, and volitional control strategies, but also motivational strategies which come into play during the learning process. We examined how two motivational strategies, self-handicapping and defensive pessimism influenced cognitive engagement and effort invested in a learning task. Our results indicate that self-schemas can be viewed as organizations of multiple goals (our self-schema measures incorporated intrinsic, extrinsic, and social concerns), and that students' cognitive engagement (here, degree of volitional control) was related to their self-conceptions. Our data also suggest that students' motivational strategies (defensive pessimism and self-handicapping) are indeed related to cognitive engagement. This study points to self-schemas, motivational strategies, and cognitive strategies as important factors in truly *self*-regulated learning.

Self-schemas, motivational strategies, and self-regulated learning

Self-regulated learning is commonly viewed as the fusion of "skill" and "will" (e.g., Paris & Winograd, 1990). Skill is generally defined as the deployment of different learning strategies, including cognitive strategies such as rehearsal and elaboration; metacognitive strategies such as planning and monitoring; and more recently, volitional control strategies such as controlling one's efforts and environment in order to protect one's intention to learn (Corno, 1993; Kuhl, 1987; Weinstein & Mayer, 1986). Will refers to students' motivation, specifically, their goals for learning (reasons for engaging in a task). Two goals have been given the most attention by researchers: intrinsic, or mastery goals, and extrinsic, or performance goals (Ames & Archer, 1988; Dweck & Leggett, 1988; Graham & Golan, 1991).

There is a large body of research documenting how skill and will are dynamically related, and the notion of self-regulated learning refers to how students regulate, or deploy different learning strategies in service of the goals they have for learning (e.g., Ames & Archer, 1988; Graham & Golan, 1991; Pintrich & De Groot, 1990). Research has shown that intrinsic, or mastery goals -- engaging in a task for reasons such as interest, challenge, or curiosity -- are more closely related to "deep" strategy use (elaboration, planning, monitoring), whereas extrinsic, or performance goals -- engaging in a task for reasons such as getting a good grade or competing with others -- are more closely related to "surface" strategy use (rehearsal).

The purpose of this study is to try to extend the definition of self-regulated learning as the deployment of cognitive strategies in service of intrinsic or extrinsic goals. We offer two suggestions: first, we propose that multiple goals (not just intrinsic *or* extrinsic) for learning can be recast as self-schemas; and second, that students engage not only in cognitive strategies when faced with a learning task, they also engage in motivational strategies, strategies which are related to affective outcomes and which directly influence the degree of effort invested in learning.

Markus and Nurius (1986) define self-schemas as "the cognitive manifestation of enduring goals, aspirations, motives, fears, and threats" (p. 954). As such, self-schemas can be characterized by four dimensions: affect; temporal sign; importance; and efficacy (Garcia & Pintrich, forthcoming). Affect refers to the affective value represented in a self-schema: the schema can be positive or negative. Self-schemas are associated with a temporal sign: we not only have conceptions of *present* selves but also of *possible* selves. Different self-schemas carry varying degrees of importance: some

self-schemas are more central to the individual than others. Self-schemas also incorporate the individual's sense of instrumentality, or perceived efficacy about maintaining/attaining or changing/avoiding a particular self. The regulation of behavior, therefore, is related to self-schemas more specifically in terms of affect, temporal sign, importance, and efficacy (Garcia & Pintrich, forthcoming). Markus and her colleagues have presented evidence for the motivational properties of self-schemas, and how the ways we think we are (present selves), and how ways we think we might become (possible selves) influence our actions.

There are several advantages to recasting goals as self-schemas. First, the notion of *schemas* may be the conceptual means of allowing for multiple, interacting goals, and of modeling how goals may be stored and represented cognitively. If goals are a form of knowledge (of knowing why one engages in a task), then cognitive psychology's hierarchical structure of knowledge, of concepts organized into propositions, and propositions organized into schemas (Miller, Galanter, & Pribram, 1960; Neisser, 1976), seems ideally suited for trying to relate multiple goals. There is a growing interest in the issue of multiple goals, and we need a theoretical framework that will accommodate multifaceted intentionality. For example, Wentzel's (1989) work on social goals reflects an interest among researchers in expanding the intrinsic/extrinsic goal framework. Using schemas to integrate goals seems to be a step in the right direction.

Why *self-schemas*? McCombs and her colleagues (McCombs, 1989; McCombs & Marzano, 1990; McCombs & Whisler, 1989) have charged that educational psychologists doing work in self-regulated learning have narrowly focused on the regulation aspect and have largely ignored the self aspect. In the same vein, Borkowski and his colleagues (Borkowski, Carr, Rellinger, & Pressley, 1990) argue that researchers should pay greater attention to the role of the self, because "the self-system provides the necessary motivation and affective states" (p. 65) while cognitive, metacognitive, and volitional control strategies provide the means for attaining self-generated, self-relevant goals. In other words, a person may not just have abstract "goals" these goals are personalized and cast in relation to oneself. For example, having a self-schema of oneself as a good student may be a means of : 1) putting the self in the foreground, putting the self and self-related affect into play; and 2) simultaneously addressing intrinsic and extrinsic concerns, by representing and linking the knowledge that one is interested in learning or that one seeks challenging tasks with the knowledge that one is concerned about grades and performance.

Finally, portraying goals as self-schemas provides us with a mechanism for goal change, an issue that is not well-addressed in goal theory as it now stands. Markus and her colleagues speak of both present and possible selves, of conceptions of how we are now and how we could become (Markus & Nurius, 1986; Markus & Wurf, 1987). Possible selves and the goals encompassed within those possible selves therefore help create new incentives for the individual, providing the impetus for cognitive engagement. This is self-regulation in the fullest sense.

Our second proposal has to do with other types of strategies students may use during learning. As educational psychologists, when we speak of strategies, we generally focus on cognitive, metacognitive and volitional control learning strategies. We would like to highlight how motivational strategies may also come into play.

Achievement settings are "risky" in the evaluative sense, and motivational strategies are a means of preparing for these risky situations. We will focus on defensive pessimism and self-handicapping as two methods for anticipating and negotiating the affective consequences of success and failure. Motivational strategies, like cognitive and metacognitive learning strategies, may also be a function of one's goals, of one's self-schemas. However, motivational strategies are affect-related processes which may influence the investment of effort. That is, trying to negotiate and prepare for the affective outcomes of evaluation may moderate the use of cognitive, metacognitive, and volitional control strategies.

Norem & Cantor (1986) define defensive pessimism as the "... setting of unrealistically low expectations...in an attempt to harness anxiety...in order to prepare for potential failure and to motivate [oneself] to work hard in order to avoid that failure..." (pp. 1208-1209). The strategy of defensive pessimism is a means of coping with the negative affect that comes with failure: if you set low expectations and fail, the pessimism, the low expectations, have allowed you to play through the situation in advance and steel yourself for that outcome. But the increase in effort does make failure

less likely, so the low expectations are often disproved by the actual success outcomes. Here, anxiety is "beneficial" since it is used to drive extra efforts, so harnessing anxiety in this manner helps to bring about positive outcomes. The defensive pessimist is easily recognizable, she is the student with terrible worries about performance, claims to be unprepared or dissatisfied with the quality of her work, yet ultimately and infuriatingly pulls A's.

If defensive pessimism is the increase in effort to negotiate affective outcomes, self-handicapping is the withdrawal or decrease in effort to negotiate affective outcomes -- specifically, the positive affect stemming from high ability evaluations. Children learn early in life about the link between ability and effort: how "smart kids" don't have to try as hard as other kids to do well in school (e.g., Nicholls, 1989). This understanding makes effort a double-edged sword Covington, 1992; Covington & Beery, 1976). High effort coupled with success is laudable, but high effort followed by failure carries devastating implications about one's ability. Self-handicappers are thought to be quite concerned about this effort-ability link (Berglas, 1985; Covington, 1992; Tice & Baumeister, 1990). The low effort self-handicappers show may have poor achievement outcomes, but the self-handicapping strategy structures a win-win situation in terms of affective outcomes, for failure following low effort may be attributed to low effort, whereas success following low effort can only imply high ability. Self-worth, positive affect is maintained whether one succeeds or fails, school is no longer "risky" if one self-handicaps.

Defensive pessimism and self-handicapping have strong implications for our understanding of self-regulated learning. The self-regulated learner is often portrayed as an intrinsically motivated, low anxious student who is actively and cognitively engaged in learning (e.g., Ames & Archer, 1988; Graham & Golan, 1991; Schunk, 1989): defensive pessimism puts a new twist to that picture. Defensive pessimists are highly concerned with performance, extrinsically motivated, highly anxious students, but seem to be greatly involved in their learning, since they use that anxiety to motivate efforts. Because of their characteristic high efforts, defensive pessimists may show greater levels of cognitive engagement, of the use of learning strategies. These students are self-regulating their learning, but use anxiety and performance concerns to drive effort. By the same token, the low effort, the low cognitive engagement by the self-handicapper may be seen also as a form of self-regulated learning. Students may use the self-handicapping strategy to regulate their behaviors in academic situations, with the regulation being the withdrawal of effort in service of performance concerns.

Our general theoretical framework is represented in Figure 1. To recap our proposals: Students personalize their goals for learning by representing goals as self-schemas. These self-schemas are characterized by several dimensions: affect, temporal sign, importance, and efficacy. Students may then regulate their use of learning strategies by how they see themselves as students (now and in the future). In addition, students' have not only learning strategies, but also motivational strategies which are related to affective outcomes of evaluative situations. Motivational strategies, like self-handicapping and defensive pessimism may, like learning strategy use, be related to students' goals for learning. Defensive pessimism and self-handicapping may moderate students' use of cognitive, metacognitive, and volitional control strategies. Motivation and strategy use ultimately lead to academic achievement, but we will not be addressing those particular links in this paper, as we do not have achievement data for this particular sample.

Accordingly, the research questions we will be addressing are: 1) How are self-schemas -- present and possible selves -- related to use of learning strategies? 2) How are defensive pessimism and self-handicapping related to the use of learning strategies? and 3) How are defensive pessimism and self-handicapping related to self-schemas?

Greater strategy use should be related to: 1) high descriptiveness and likelihood of positive academic self-schemas; 2) low descriptiveness and likelihood of negative academic self-schemas; 3) high ratings of importance and of efficacy (of both positive and negative selves); and 4) defensive pessimism. Defensive pessimists should report the highest levels of effort and cognitive engagement, while self-handicappers should report the lowest levels of effort and cognitive engagement.

With regard to the relationship between self-schemas and motivational strategies, defensive pessimists and self-handicappers were expected to report highly salient negative self-schemas, the image of the self as a failure being a very potent incentive to engage in these motivational strategies.

The patterns of likelihood, importance, and efficacy might differ, however, and provide us with some insights as to why one group of students increases effort while the other group decreases effort.

Method

Subjects

Participants were 151 seventh-grade boys and girls from a working-class suburb of a midwestern city. Six classrooms spanning four subject domains (English, math, science, social studies) were sampled. Girls comprised 57% of the sample (n = 86), and the mean age was 12.8 years. Questionnaires were administered towards the end of the school year, in May 1992.

Measures

Three surveys, the "School and School Work," the "What I Am Like," and "What I Could Be Like" questionnaires were administered by the teachers over two class periods. These are self-report, Likert-scaled instruments, ranging from 1 (low) to 7 (high). Our defensive pessimism, self-handicapping, and learning strategies (volitional control) measures were taken from the School and School Work questionnaire; our measures of present and possible selves were taken from the What I Am Like and What I Could Be Like questionnaires. Scale reliabilities (Cronbach alphas) range from .57 to .89.

The volitional control scale taps into processes such as attention, encoding, motivation, and environmental control (e.g., "I make sure I do my homework even when I want to watch television" and "When I do my homework, I am able to block out distractions and concentrate on what I am doing").

Self-handicappers were identified as students who scored at the top quartile of the self-handicapping scale (adapted from Strube, 1986. Sample item: "I tend to wait to do things for school until the last minute"). Defensive pessimists were identified as those who were in the top quartile of the pessimism scale (adapted from Norem & Cantor, 1986. Sample item: "I often think about what it will be like if I did very poorly in school") and in the top quartile of the question, "I've generally done pretty well in school." Therefore defensive pessimism was operationalized as those students who are pessimistic *despite* being cognizant of a history of success. Forty-three self-handicappers and ten defensive pessimists were identified using these criteria. We found statistically significant gender differences: more self-handicappers were boys, whereas more defensive pessimists were girls ($\chi^2(2, N = 151) = 7.51, p < .05$). There were no students who used both motivational strategies: they used either defensive pessimism, self-handicapping, or neither.

Present and possible selves were parallel items, the former focusing on "yourself now" and the latter on "yourself five years from now." The "good student" present and possible selves were aggregates of: has high grades on report card; understands everything that teachers explain; finishes class work on time; pays attention when teacher is talking; and follows directions while doing class work. The "bad student" present and possible selves were aggregates of: needs help from classmates; has a hard time finishing homework assignments; does not know answer when called on by teacher; late for class without an excuse; sent to principal's office; and talks during class time. Therefore the "good student" and "bad student" self-schemas encompassed concerns related to an intrinsic goal orientation, an extrinsic goal orientation, and social conventions (multiple goals).

We also obtained measures of the importance of the different selves and of how efficacious students felt about maintaining/attaining positive selves and changing/avoiding negative selves. The likelihood, importance, and efficacy questions for the present selves were as follows: "How much are you like this now?" "How important is being/not being this way in the overall way you think about yourself?" and "How sure are you that you can do things to make yourself stay the same/change the way you are?" The corresponding questions for the possible selves questionnaire read as follows: "How likely will this describe you five years from now?" "How important is trying to become/avoiding becoming this way in the future, in the overall way you think about yourself?" and "How sure are you that you can do things to make yourself become/avoid becoming this way?"

Analyses

Zero-order and point-biserial correlations between volitional control, motivational strategies, and self-schemas were computed to examine the bivariate relationships among these constructs. We used simple oneway analyses of variance and post hoc contrasts to compare the means of students identified as self-handicappers, as defensive pessimists, and as "control" (neither self-handicapping nor or defensively pessimistic) on measures of: use of volitional control strategies; present selves; and possible selves.

Results

Relationship between volitional control and self-schemas

With regard to self-schemas, endorsements of the good student present self as "very much like me" and the good student possible self as "very likely of me in 5 years" were positively related to students' reports of volitional control (r = .72, p < .001 with the good student present self and r = .45, p < .001 with good student possible self, see Table 1). Conversely, endorsements of the bad student present self as "very much like me" and the bad student possible self as "very likely of me in 5 years" were negatively related to students' reports of volitional control (r = -.59, p < .001 and r = -.15, p < .05, respectively). In other words, students who saw themselves as good students now, and/or saw themselves as likely to become good students in the future were able to exercise high levels of control over their attention, encoding, and environment during study sessions. The reverse was true for students who saw themselves as poor students now, and/or who viewed themselves as likely to become poor students in the future.

Students' ratings of importance and of efficacy were all positively related to volitional control (r's range from .15 to .53, all significant at p < .05). In other words, students who rated present and possible self-schemas as more important (students who were more concerned about the good student and bad student selves) reported higher levels of volitional control, as did students who reported higher levels of efficacy about maintaining/attaining the good student self and to changing/avoiding the bad student self. This is consistent with Eccles' work on the motivational properties of the value assigned to a task (e.g., Eccles, 1984, 1987) and on Schunk's work on the motivational properties of efficacy beliefs (e.g., Schunk, 1989). Eccles argues that the value assigned to an object or an activity motivates behaviors directed at reaching that goal; similarly, Schunk highlights the importance of beliefs about one's instrumentality in goal-striving. In this case, the importance of a present or possible self and the efficacy one feels in maintaining/attaining or changing/avoiding a present or possible self are positively related to the use volitional control strategies.

Relationship between volitional control and motivational strategies

Volitional control was positively related to defensive pessimism (point-biserial r = .18, p < .05) and negatively related to self-handicapping (point-biserial r = -.38, p < .001, see Table 1). These values indicate that compared to the other students, defensive pessimists were moderately higher in their endorsements of volitional control. Compared to defensive pessimists and "control" students, self-handicappers were moderately lower in their endorsements of volitional control.

We can recast our interpretations of the point-biserial correlations in an ANOVA framework (see Table 2). Students who were defensively pessimistic reported the highest level of volitional control (M = 4.84), followed by control (M = 4.30) and self-handicapping students (M = 3.44). Defensive pessimists were significantly different from self-handicappers in this regard. Given the definitions of defensive pessimism and self-handicapping, these findings are consistent with previous research. Defensive pessimists were able to manage their efforts quite well in the face of distractions and temptations, whereas self-handicappers were not as successful in balancing competing demands.

Differences in present selves by motivational strategies

Contrary to our expectations, defensive pessimists, despite their reported worrying, endorsed the good student present self more highly ("very true of me") than control or self-handicapping students (see Table 2). Defensively pessimistic students differed significantly from self-handicapping students

in reporting the good student present self as being more true of themselves (means are 5.30 and 4.04, respectively), and the bad student present self as being less true of themselves (means are 2.52 versus 3.70). Defensive pessimists also differed significantly from self-handicappers in endorsing the importance of and in how efficacious they felt about maintaining the good student present self (see Table 2). Regarding self-handicappers, the lower endorsement of the good student present self, the lower levels of efficacy, and the higher endorsement of the bad student present self is in line with previous research: self-handicapping is thought to be due to a fragile self-conception of oneself as competent and able (Berglas, 1985). The findings here for students who are defensively pessimistic seem puzzling: if they see themselves as better students, value that greatly, and are quite sure they can maintain being good students, where do the worries and concerns with performance stem?

Differences in possible selves by motivational strategies

As in our results for present selves, defensive pessimists also view the good student possible self as more likely and are more efficacious about achieving this possible self than self-handicapping students (respective means are 5.85 versus 4.83 for likelihood, and 6.00 and 4.97 for efficacy). Students did not differ in the importance of the good student possible self. Nor did the three types of students differ in ratings of the likelihood of the bad student possible self. Defensive pessimists did report that avoiding the bad student possible self was more important than control or self-handicapping students, and defensive pessimists were more efficacious about avoiding the bad student possible self than self-handicapping students. These results may provide a clue as to why defensive pessimists worry about the future, despite knowing that they are at the present, quite good students. Although defensive pessimists did not report negative selves as being more likely than control or self-handicapping students -- in fact, they reported slightly lower likelihoods of negative possible selves -- the possibility of being a poor student was much more *important* for defensive pessimists. In line with the findings about present selves, self-handicappers were less efficacious about attaining the good student possible self and avoiding the bad student possible self (see Table 2).

Discussion

With regard to using self-schemas as a means of representing multiple goals and of putting the self in the foreground, our results support the following conclusions. First, academic schemas can indeed be seen as organizations of multiple goals. Internal reliability coefficients (Cronbach alphas) for the self-schema measures were quite good, ranging from .64 to .88. The good student and bad student self-schemas reflected intrinsic, extrinsic, and social convention concerns. In future research, using self-schemas as multidimensional organizations of goals, aspirations, and beliefs about oneself may allow us to factor in mastery, performance, and social goals to assess the joint influence of these goals on learning. Second, students' use of volitional strategies are related to their academic self-schemas. These data suggest that students regulate their efforts as a function of their self-conceptions.

Regarding motivational strategies, our results support the notion that students regulate their learning not only by use of cognitive, metacognitive, and volitional control strategies, but also by use of motivational strategies. Limiting our definition of strategies to cognitive, metacognitive, and volitional control strategies is not sufficient: we must also consider how motivational strategies may factor into the learning process. We should not neglect the fact that there are affective outcomes to learning, being in school not only means trying to learn, but also being evaluated. Strategies such as defensive pessimism and self-handicapping are a means of anticipating and preparing for possible negative outcomes. In addition, motivational strategies are linked to cognitive engagement. We have presented evidence that self-handicapping and defensive pessimism are related to the use of volitional control strategies. Cognitive, metacognitive, volitional control, and motivational strategies are learning strategies in the fullest sense: "thoughts and behaviors that a learner engages in during learning" (Weinstein & Mayer, 1986, p. 315).

This study is a preliminary step towards expanding the common definition of self-regulated learning. Our findings indicate that self-schemas, motivational strategies, and cognitive strategies are important factors in truly *self*-regulated learning.

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Table 1

Descriptive statistics for volitional control, pessimism, self-handicapping, and self-schema measures

Scale	M (SD)	Cronbach's Alpha	r with volitional control
Volitional control	4.09 (1.11)	.76	----
Pessimism	3.79 (1.81)	.76	.08
Self-handicapping	4.30 (1.44)	.57	-.63***
Defensive pessimism (0 = no; 1 = yes)	.07 (.25)	----	.18*
Self-handicapping (0 = no; 1 = yes)	.29 (.45)	----	-.38***
General academic self-schemas			
"Good student" present self			
how much like me	4.57 (1.24)	.83	.72***
importance of being this way	5.10 (1.20)	.80	.53***
efficacy in staying/changing being this way	5.22 (1.11)	.83	.35***
"Bad student" present self			
how much like me	3.29 (1.10)	.64	-.59***
importance of being this way	4.53 (1.19)	.67	.15*
efficacy in staying/changing being this way	5.24 (1.15)	.83	.15*
"Good student" possible self			
how likely of me 5 years from now	5.13 (1.17)	.84	.45***
importance of attaining	5.45 (1.17)	.83	.36***
efficacy in attaining	5.36 (1.16)	.86	.34***
"Bad student" possible self			
how likely of me 5 years from now	3.78 (1.42)	.82	-.15*
importance of avoiding	4.72 (1.38)	.81	.16*
efficacy in avoiding	5.26 (1.31)	.88	.21**

Note. Significance levels are denoted as follows: + $p < .10$; * $p < .05$; ** $p < .01$; *** $p < .001$.

Table 2

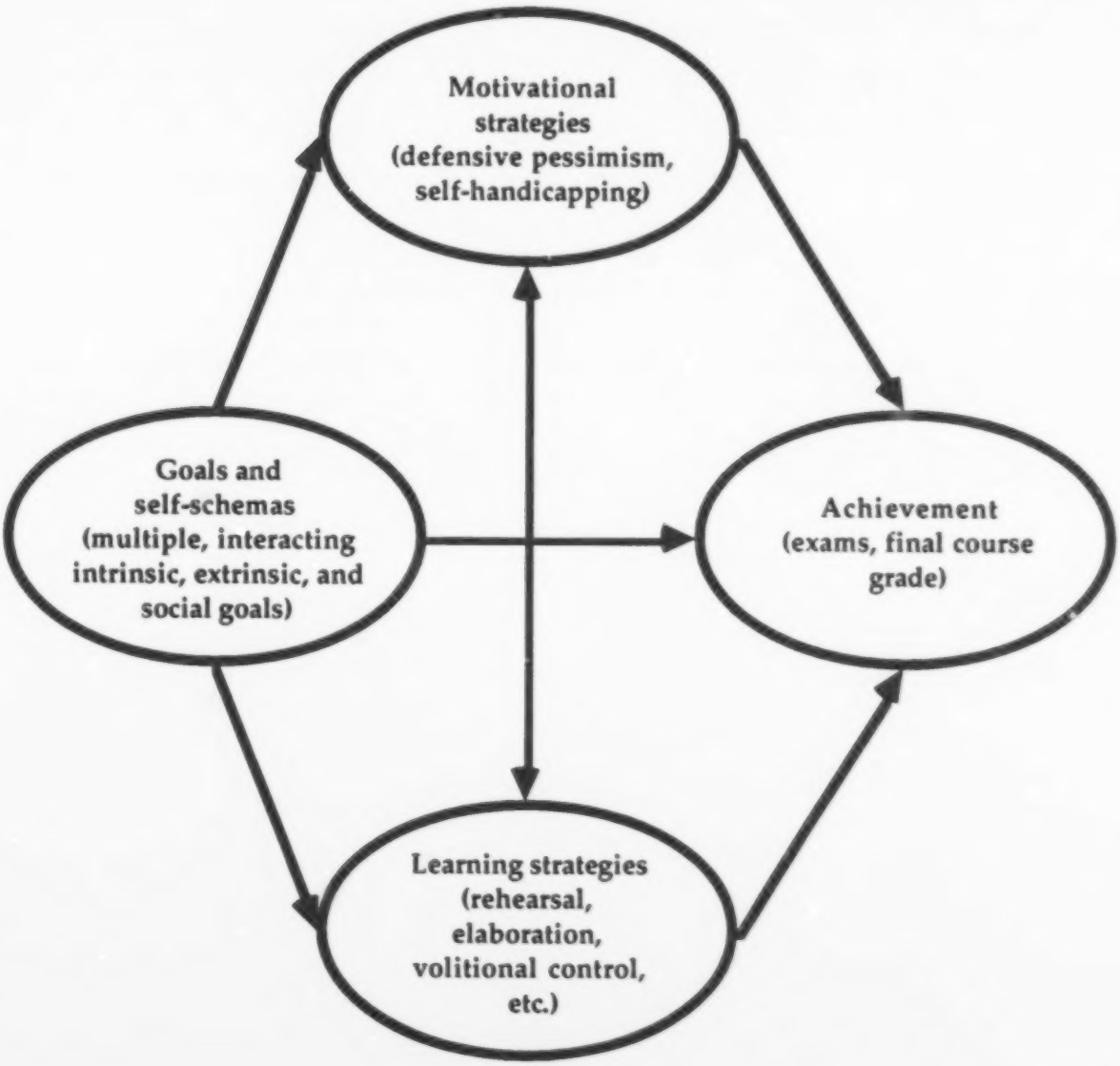
Volitional control and academic self-schemas: mean differences between students

Scale	Control (n = 98)	Defensive Pessimists (n = 10)	Self-Handicappers (n = 43)	F (2,145)
Volitional control	4.30_a	4.84_a	3.44_{ab}	13.43***
General academic self-schemas				
"Good student" present self				
how much like me	4.71_a	5.30_a	4.04_b	6.48**
importance of being this way	5.10_{ab}	6.00_a	4.88_b	3.63*
efficacy in staying/changing being this way	5.29_{ab}	5.92_a	4.85_b	4.66*
"Bad student" present self				
how much like me	3.21_{ab}	2.52_a	3.70_b	5.80**
importance of being this way	4.55	5.08	4.34	1.60
efficacy in staying/changing being this way	5.24	5.93	5.05	2.40+
"Good student" possible self				
*how likely of me 5 years from now	5.19_{ab}	5.85_a	4.83_b	3.35*
importance of attaining	5.47	6.02	5.28	1.51
*efficacy in attaining	5.47_a	6.00_a	4.97_b	4.39*
"Bad student" possible self				
how likely of me 5 years from now	3.71	3.52	3.99	.75
importance of avoiding	4.68_a	6.09_b	4.52_a	5.21**
*efficacy in avoiding	5.37_a	5.93_{ab}	4.88_b	3.44*

Note 1. Means with different subscripts are significantly different from one another at alpha = .05 (post hoc Scheffe and Neuman-Keuls tests. Scales marked with an asterisk show results from the Neuman-Keuls test).

Note 2. Significance levels are denoted as follows: + $p < .10$; * $p < .05$; ** $p < .01$; *** $p < .001$.

Figure 1. General theoretical model.


Motivational strategies (defensive pessimism, self-handicapping)
Goals and self-schemas (multiple, interacting intrinsic, extrinsic, and social goals)
Achievement (exams, final course grade)
Learning strategies (rehearsal, elaboration, volitional control, etc.)